

band of westerly winds, while the easterly winds disappear even more easily a little way south of the southern coasts of that continent.

In general dry air is denser than moist air of the same pressure and temperature. Lines of equal density drawn on the globe show that a unit volume of continental denser air is driven by centrifugal force toward the equator more forcibly than the same volume of oceanic moister air. The interaction of such masses is much more prominent in the Northern than in the Southern Hemisphere, where densities are more equable and every phenomenon is dominated by the great antarctic vortex. Here the air overflowing from the Tropics whirls around the South Pole as at *a* and *b*, fig. 1, descending more slowly than in our Arctic regions. But eventually its temperature falls by radiation more than it warms by descent, and it reaches a low level, where it is at once whirled outward, as at *c* and *d*, thus constituting a great anticyclone in the Southern Hemisphere analogous to the cyclone with cold center in the Northern Hemisphere, as originally explained by Ferrel. The reason why the upper air at *a* flows inward and the lower air at *d* flows outward is that the upper air has a potential density greater than the lower air, since the latter has lost some heat by radiation; hence for the same velocity of rotation around the South Pole the lower air has a larger centrifugal component, and as it flows outward the upper air must descend to take its place. A similar centrifugal force is utilized daily in our drying machines, cream separators, and other devices.

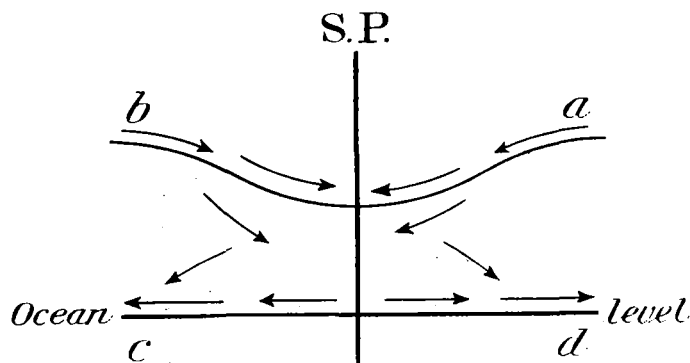


FIG. 1.—The general circulation about the South Pole.

As the air that has descended experiences greater resistance as it flows along over the Antarctic Continent toward *c* and *d* than it did when flowing as upper air from *a* and *b* toward the pole, therefore its velocity is diminished somewhat, and a slight increase in the gradient of pressure toward the equator is produced near the polar region; so that the pressure at sea level in that region is a little higher than in a zone of lowest pressure that must be formed somewhere near the Antarctic Circle.

(2) The four seasonal charts and one annual chart of isotherms and isobars with prevailing winds, and especially the seasonal and annual charts of rainfall with diagrams of monthly and annual temperatures and the rainfall at Sydney, N. S. W., 1840–1906, will tempt many to search for periods and correlations. But we must urge that any such effort be made with full recognition of the internal mechanics of the atmosphere, and not by any purely superficial methods. The latter are too apt to lead to error; the former are more difficult, but are rational and must eventually lead up to important generalizations.—C. A.

#### ELECTRIC SPARK PRODUCED WHEN ICE IS FORMED.

Dr. T. L. Phipson, in his book "Phosphorescence", London, 1862, page 29, publishes the following suggestive paragraph:

A most interesting production of light was observed and published ("Journ. des Sc. Physiques et Chimiques", de M. de Fontenelle) by Professor Pontus, in 1833, who showed that a vivid spark is produced when

water is made to freeze rapidly. A small glass globe, terminating in a short tube, is filled with water, the whole is covered with a sponge or cotton-wool imbibed with ether, and placed in an air-pump. As soon as the experimenter begins to produce a vacuum, the ether evaporates, and the sponge or cotton-wool dries, the temperature of the water descends rapidly. But some instants before congelation takes place, a *brilliant spark, perfectly visible in the daytime*, is suddenly shot out of the little tube that terminates the glass globe. M. Pontus has repeated the experiment often, and says that the production of this spark is a sure sign that congelation is about to happen.

The Editor has not been able to obtain the original memoir by Professor Pontus, but if there be no mistake in this experiment and observation then we have here a very plausible explanation of the origin of the lightning that attends hail and thunderstorms in the summer and equally so of the gentler electric discharges attending thunderstorms in winter—possibly also of the still gentler auroral discharge. Will not some one investigate this subject anew?—C. A.

#### THE JAMAICAN WEATHER SERVICE.

By D. T. MARING, Instrument Division, U. S. Weather Bureau. Dated August 1, 1907.

The reestablishment of the weather service for the island of Jamaica, under its own government control, will be welcomed by all interested in meteorology. Tho comparatively small in extent of territory, this island occupies an important geographical and meteorological position in the West Indies, at the northern edge of the Tropics. What might otherwise be a torrid and unbearable climate is completely modified by the lofty mountains of the interior. The healthfulness of the temperate zone is combined with the beauties of tropical scenery, to the delight and admiration of hundreds of tourists who annually land on its shores.

At the time when the general meteorological service of the United States was temporarily extended to embrace all of the West Indies, in 1898, a fully equipped station was established at Kingston, in August of that year. It was found that none of the comparatively low buildings in the business part of the city of Kingston afforded suitable exposures for the Weather Bureau instruments, and it was necessary to locate the station in the residential section of the suburbs. The building selected was a new residence villa belonging to Mr. Humphreys, C. E., situated on the road to the King's House, a short distance above the point known as "Half Way Tree", about 3 miles northwest of the cable office; here the barometers had an elevation of 286 feet above sea level. The exposures of instruments are clearly shown on the accompanying photograph, fig. 1, procured July, 1899, by Mr. C. F. Talman, observer in charge at that time. The observations and records of this station were, of course, placed at the command of all Jamaicans, and shortly afterwards (February, 1899), the local government service that had been maintained for many years, was discontinued. In July, 1903, it became necessary for the U. S. Weather Bureau to discontinue its fully equipped station at Kingston, since which time a special hurricane station only has been kept in operation from July to October of each year. The instrumental equipment of this hurricane station having been wrecked in the earthquake of January, 1907, as shown by photograph, fig. 2, the writer was detailed to proceed to Kingston and reestablish this telegraphic reporting station for the current year. Upon arrival at Kingston the conditions were found to be such as to preclude the possibility of reopening the station, as formerly, in the hands of local operators of the cable company. It was then ascertained that for several years past Jamaican scientists and members of their agricultural society had been agitating the question of restoring their own government weather service. This was felt to be urgently needed, not only for their own climatic studies, but for the benefit of large and growing agricultural and commercial interests involved in the raising and shipping of tropical products to neighboring countries.

Under the liberal administration of the new governor, Sir

Sydney Olivier, K. C. M. G., who takes a personal interest in meteorology and the welfare of everything pertaining to the interests of this beautiful island, the meteorological service is now being resumed. The following special message on this subject, from his excellency the governor, recently submitted to the legislative council, clearly explains the situation:



FIG. 1.—U. S. Weather Bureau office, Kingston, Jamaica, from July, 1898, to July, 1903.

MESSAGE FROM HIS EXCELLENCY THE GOVERNOR TO THE HONOURABLE THE LEGISLATIVE COUNCIL OF JAMAICA.

*Honourable Gentlemen:*

I have the honour to inform you that I have received a resolution passed by the Jamaica Agricultural Society at their last half-yearly general meeting, inviting the attention of the government to the need for restoration of the meteorological service in this island. I have consulted my Privy Council on this subject and they agree with me in thinking that the time has come when this service should be restored. The meteorological service, which had existed since the year 1880, was from the urgent necessity for economy practically abolished in the year 1899, when it was reduced to the compilation of rainfall statistics, and the total abolition of any separate vote for this latter kind of work occurred in the year 1902 when such work was allotted to the staff of the Island Chemist.

The restoration of the service as it existed for many years would enable us again to have a useful local system of storm warnings together with complete meteorological returns for the capital of this island which, for some years, has had to do without them. It would also enable a revision to be made of the rainfall maps of the island which were prepared some years ago after twenty years registration, but which should now be compiled on the results of some forty years registration. The scheme now proposed would also include a modest time service whereby the correct time could be notified throughout the island from the island telegraph office in Kingston. Other work of a miscellaneous and useful character would from time to time be performed. The chief

reason, however, which impels me to suggest to you at this particular time the desirability of the restoration of the weather service is the first one set out above, viz: that we should have an effective system of local storm warnings. At the time of the abolition of the old service the island was fortunate in having had recently established in its midst a well-equipped station with a resident staff supported by the United States Government and the island benefited by the generosity of that Government. Since then that service has been reduced and the staff withdrawn, and in the public interest a local system of storm warnings seems necessary. The value of such a system is of two kinds, one positive, the issuing of notices of approaching cyclones and the other negative, the issuing of notices to dispel false alarms. It has been represented to me that on the occasion of the last cyclone in August, 1903, one firm alone in a seaport town of Jamaica lost in the value of lighters about four times the annual cost of the weather service which it is stated would have been saved if the old weather service with its system of telegraphic warnings throughout the island had then been in existence. Doubtless there are other instances of a like nature within the memory of honourable gentlemen. The dispelling of false alarms is also of great value and is often the means of saving money which would otherwise be needlessly expended.

A resolution will therefore be submitted to you inviting you to vote a sum at the rate of £150 a year for the restoration of the island weather service.

SIDNEY OLIVIER, Governor.

KING'S HOUSE, 27th June, 1907.



FIG. 2.—U. S. Weather Bureau office, Kingston, Jamaica, from July, 1903, to January, 1907. Rear view of building containing offices of the Royal Mail Steamship Company, showing exposures of wind instruments, etc., as wrecked by the earthquake of January 14, 1907.

The resolution mentioned was accordingly promptly presented, past July 3, 1907, and became a law, and the new weather service is therefore assured the desired financial assistance from the colonial government.

Taking advantage of these favorable circumstances, successful negotiations were at once entered into by myself, on

behalf of the Chief of Bureau, with a view to securing cooperation between the Jamaican Service and the United States Weather Bureau. Arrangements were made whereby officials of the Department of Public Works are to make and render the special telegraphic observations required at Washington during the hurricane season, in consideration of the turning over to them of the necessary Weather Bureau instruments and apparatus and the cabling to them of advance information of all hurricanes or violent storms likely to affect their island. This arrangement will, it is believed, prove mutually satisfactory. It also insures for the Weather Bureau the permanence and continuity of meteorological observations at Kingston by trained government officials.

The reorganization of the new Jamaican Weather Service has been placed in the hands of the well known meteorologist, Hon. Maxwell Hall, who formerly had charge of this work, and his knowledge of local needs and conditions insures that the work will be well done. The United States Weather Bureau has cordially agreed to extend all possible cooperation and assistance.

### INTERESTING LUNAR CORONA.

By CHARLES MIFFLIN HAMMOND. Dated Upper Lake, Cal., July 29, 1907.

Wednesday evening, July 24, I was watching the lunar eclipse; and just as it was passing off, about 9:30, thin, fleecy clouds began to approach the moon from the southwest. As the point of the bank approached it took on a golden-bronze hue, light close to the moon, and darker at a distance. When the clouds were completely between me and the moon there was a complete circle of this light in diameter about twelve diameters of the moon. The clouds were not thick enough to materially obscure the light of the moon. This golden circle gradually faded away. It was unlike anything I had ever seen before, as it did not in the least resemble the ordinary lunar halo; for it was far smaller and was a solid mass of color, tho decidedly lighter in the center, and at the outer edge it shaded off rapidly almost into black, while the clouds were a fleecy white. I saw in one of the Ukiah newspapers—Ukiah being about 20 miles northwest of us—that the last of the eclipse was obscured by a thick bank of clouds. Undoubtedly they were the same ones I saw, but no mention was made of my observations. I regularly watch the moon when it is up, and have done so for years, and repeat that I never saw anything like this before.

### RECENT ADDITIONS TO THE WEATHER BUREAU LIBRARY.

H. H. KIMBALL, Librarian.

The following titles have been selected from among the books recently received, as representing those most likely to be useful to Weather Bureau officials in their meteorological work and studies. Most of them can be loaned for a limited time to officials and employees who make application for them.

#### Weber, F. Parkes and Hinsdale, Guy.

Climatology; health resorts; mineral springs. In two books. Philadelphia. 1902. ix, [10]-336; x, [11]-420 p. 8°.

#### Wheeler, W. H.

A practical manual of tides and waves. London. 1906. viii, 201 p. 8°.

#### Krebs, Wilhelm.

Einige Beziehungen des Meeres zum Vulkanismus. Berlin. 1904. 17 p. f°.

#### Fernley observatory. Southport.

Report and results of observations. 1906. Southport. 1907. 33 p. 8°.

#### Koch, Albert.

Das Klima von Hallem vom Saal und Mansfelder Seekreise. Halle a S. 1907. 32 p. 8°.

#### Norway. Norske meteorologiske Institut.

Nedboriagttagelser i Norge. 1906. Kristiania. [1907] xx, 219 p. f°.

#### Bologna. Università. Osservatorio.

Osservazioni meteorologiche 1905. Bologna. 1906. 31 p. f°.

#### Krüger, Friedrich.

Die Niederschlagsverhältnisse und Gewitter in Herzogtum Sachsen-Altenberg 1900-1904. Altenburg. 1905. 33 p. 8°.

43—3

#### Oddone, Emilio.

Quelques constantes sismiques trouvées par les macrosismes. [Strasbourg. 1907.] 27 p. 4°.

#### Altenburg (Germany). Sternewart.

Die Witterungsverhältnisse von Altenburg und Umgegend. . . 1 Juni 1899 bis 31 Mai 1904. Altenburg. 1904. 19 p. 8°.

#### Hoyt, John C.

Comparison between rainfall and run-off in the northeastern United States. (In Proc. Am. soc. of civ. eng. v. 33, no. 5. May, 1907, p. 452-505.)

#### Ehrhart, Sebald Bernhard.

Die Verteilung der Temperatur und des Luftdruckes auf der Erdoberfläche im Polarjahre 1882-87. Stuttgart. n. d. 35 p. 8°.

#### Delory, L.

Essai de météorologie. Béthune. 1901. 92 p. 8°.

#### Fiala, Anthony.

Fighting the polar ice. New York. 1907. xxii, 296 p. 4°.

#### Chili. Servicio meteorológico de la Dirección del territorio marítimo.

Anuario 1905. Valparaíso. 1907. 402 p. 4°.

#### Dallet, G.

La prévision du temps et les prédictions météorologiques. Paris. n. d. 336 p. 12°.

#### Indo-China. Service météorologique.

Carte pluviométrique de l'Indo-Chine 1906. n. p. [1907.] 1 sheet. 60 x 82 cm.

Observation de l'éclipse de soleil de l'Indo-Chine 1906. Hanoi. 1907. 3 p. 4°.

#### Kozak, Josef.

Meteorologische Beobachtungen. Wien. 1906. vi, 191 p. 8°.

#### Norway. Norske meteorologiske Institut.

Jahrbuch 1906. Kristiania. 1907. xii, 121 p. f°.

#### Greenwich. Royal observatory.

Results of the magnetical and meteorological observations 1905. Edinburgh. 1906. v. p. f°.

#### Haracic, Ambrogio.

L'isola di Lussin. Lussinpiccolo. 1905. 290 p. 8°.

#### Sweden. Statens meteorologiska Centralanstalt.

Meteorologiska iakttagelser i Sverige. 1906. Uppsala. 1907. x, 157 p. f°.

#### Prussia. Königliches preussisches meteorologisches Institut.

Ergebnisse der Gewitter-Beobachtungen 1901 und 1902. Berlin. 1907. xlv, 63 p. f°.

Ergebnisse der meteorologischen Beobachtungen in Potsdam 1903. Berlin. 1907. vii, 118 p. f°.

#### India. Meteorological department.

Memorandum on the meteorological conditions in the Indian monsoon region . . . 1907. Simla. 1907. 7 p. f°.

#### Bracke, A.

Les curiosités atmosphériques en 1906. Mons. 1907. 96 p. 8°.

#### Roumania. Institutul meteorologic.

Buletinul lunar 1905. Bucuresti. 1906. 254 p. f°.

#### Hepites, St. C.

Secetele in România. Bucuresti. 1906. 48 p. 8°.

#### Hepites, St. C. and Murat, I. St.

Meteorologia si metrologia in România. Bucuresti. 1906. ii, 131 p. 8°.

#### St. Ignatius college (Cleveland). Meteorological observatory.

Twelfth annual report. Cleveland. 1906-7. 26 p. 8°.

#### Charcot, J[ean] B[aptiste].

Le "Francis" au pôle sud. Paris. [1906.] xxxvii, 486 p. 4°.

#### Amery, P. F. S.

Rainfall at Ashburton. (Repr. Trans. Devonshire assoc. adv. sc. 1906. v. 38, p. 82-86.)

#### Krüger, Friedrich.

Die Bedeutung der Witterungskunde und Wettervorhersage für den praktischen Landwirt. (S.-A. Fühlings Landwirtschaftliche Zeitung.)

#### Overbeck, —.

Beiträge zur Klimatologie Meissens. (In Jahresbericht der Fürsten- und Landesschule St. Afra, Meissen, 1906, p. 1-49.)

#### Abbe, Cleveland.

The progress of science as illustrated by the development of meteorology. (Repr. Phil. soc. Washington, Bull. v. 15, p. 27-56.)

#### Seidler, Hermann.

Die Temperaturverhältnisse der Westbeskiden. (In Mitteilungen des Beskidenvereins. Bieltitz-Biala, 1 Jahrg., 1904, p. 36-43, 51-58.)

#### Angot, Alfred.

Instructions météorologiques. 4th ed. Paris. 1903. vi, 163 p. 8°.

#### Journal de physique.

Table analytique et table par noms d'auteurs des trois premières séries du Journal de physique 1872-1901. Paris. n. d. xv, 182, 159 p. 4°.

#### Mandl, Johann, tr.

Preces an repellendam tempestatem. Der Wettersegen nach dem Römischen Rituale. Regensburg. 1906. 16 p. 24°.